

Rainfall data.

Stations.	Elevation.	Oct., 1901.	Stations.	Elevation.	Oct., 1901.
HAWAII.					
Hilo, e. and ne.	Feet.	Inches.	MAUI—Continued.		
Waialea	50	11.60	Haleakala Ranch, n.	2,000	0.85
Hilo (town)	100	9.51	Wailuku	200	0.42
Kaunana	1,250	15.99	LANAI.		
Pepeekeo	100	9.03	Keomuku, e.	8	.....
Hakalau	300	.....	OAHU.		
Honohu	300	.....	Punahou (W. B.), sw.	47	4.14
Laupahoe	500	.....	Kulaokahua, sw.	50	3.56
Ookala	400	5.94	Makiki Reservoir	120	3.64
HAMAKUA, ne.			Kewalo (King street), sw.	15	3.77
Kukui	250	4.90	U. S. Naval Station, sw.	10	3.92
Pasaulo	750	.....	Kapiolani Park, sw.	285	3.20
Pasaulu Mill (Gibb)	900	2.73	Manoa (Woodlawn Dairy), c.	50	.....
Pasaulu (Greig)	1,150	.....	School street (Bishop), sw.	700	4.94
Honokaa (Muir)	425	2.56	Pacific Heights, sw.	80	3.08
Honokaa (Rickard)	1,900	.....	Ineane Asylum, sw.	280	.....
Kukuihaele	700	2.72	Kalihi-uka	75	.....
KOHALA, n.			Kamehameha School.	50	3.66
Awini Ranch	1,100	.....	Nuuanu (W. W. Hall), sw.	250	.....
Niuli	200	4.44	Nuuanu (Elec. Station), sw.	405	5.80
Kohala (Mission)	521	3.54	Nuuanu (Luakaha) c.	850	10.76
Kohala (Sugar Co.)	235	4.72	Waimanalo, ne.	25	2.14
Hawi	300	.....	Maunawili, ne.	300	4.17
Hawi Mill	500	.....	Kaneohe, ne.	100	.....
Waimea, e.	2,720	0.70	Ahulimanu, ne.	350	6.58
KONA, W.			Kahuku, n.	25	1.47
Kailua	950	2.72	Wailua, n.	20	1.60
Holualoa	1,350	3.54	Wailua, c.	900	2.68
Kealahou	1,580	3.64	Ewa Plantation, s.	60	3.85
Napooopo	25	.....	Waipahu, s.	200	4.64
KAU, se.			Moanalua, sw.	15	4.47
Kahuku Ranch	1,680	10.00	KAUAI.		
Honoupo	15	4.59	Lihue (Grove Farm), e.	200	10.20
Naalehu	650	7.78	Lihue (Molokoa), e.	300	11.90
Hilo	310	9.10	Lihue (Kukaua), e.	1,000	14.28
Pahala	550	5.54	Keala, e.	15	8.16
Moaula	1,700	15.41	Kilauea, ne.	825	5.79
PUNA, e.			Hanalei, n.	10	7.87
Volcano House	4,000	6.66	Wailua, sw.	33	0.05
Olaa	1,700	13.08	Elele, s.	200	1.24
Olaa	.....	.....	Wailua, Mountain, s.	2,100	16.14
Kapoho	110	.....	McBryde (Residence)	850	4.66
Kalapana, se.	8	.....	Lawai	450	6.98
MAUI.			Too late for last report—		
Lahaina	700	1.99	Kahuku Ranch	.....	2.41
Walopae Ranch	285	5.17	Kailua	.....	4.98
Kaupo (Mokulau), s.	300	4.86	Walopae	.....	0.44
Kipahulu, s.	1,550	.....	Haleakala Ranch	.....	0.98
Kahikinui	60	2.98	Laupahoe	.....	1.97
Hamoa Plantation, se.	60	5.69	Hakalau	.....	5.31
Nahiku (Anderson), ne.	800	10.39	Honohina	.....	4.08
Nahiku (Nishwitz), ne.	700	4.28	Elele	.....	0.48
Haku, n.	4,500	0.17	McBryde	.....	1.90
Kula (Erehwon), n.	2,700	0.01	Puomalei	.....	0.82
Kula (Waialoa)	1,400	3.22	Hawi Mill	.....	0.77
Puomalei, n.	180	1.08			

GENERAL SUMMARY FOR OCTOBER, 1901.

Temperature mean for the month, 75.8°; normal, 76.3°; averagedaily maximum, 81.9°; average daily minimum, 70.5°; average daily range, 11.4°; greatest daily range, 17°; least daily range, 5°; highest temperature, 84°; lowest, 66°.

Barometer average, 29.950; normal, 29.966; highest, 30.06; lowest, 29.81; greatest 24-hour change, .10. Lows passed this point on the 1st, 10th, and 23d; highs, on the 7th, 19th, and 28th. It will be interesting to note whether seven successive months of low barometer will be followed by unusually heavy rains.

Relative humidity, 76.0 per cent; normal, 72.5; mean dew-point, 67.8; normal, 66.1; mean absolute moisture, 7.45 grains to the cubic foot; normal, 7.06.

Rainfall, 4.14 inches; normal, 2.46; rain record days, 22; normal, 19; greatest rainfall in one day, 2.79, on the 2d; total at Luakaha, 10.76; at Kapiolani Park, 3.12. Total rainfall since January 1, 28.96; normal, 27.24.

The artesian well water stands at 33.12 feet above mean sea level. At the same date in 1900 it stood at 33.19. The average daily mean sea level for October was 10.37 feet on the scale; 10.00 representing an assumed annual mean, and 9.82 the actual annual mean for nine years previous to 1901.

Trade wind days, 24 (8 of north-northeast), normal, 22; average force (during daylight) Beaufort scale, 2.3. Cloudiness, tenths of sky, 4.7; normal, 4.3.

Approximate percentages of district rainfall as compared with normal: Hilo, 90 per cent; Hamakua, 75; Kohala, 120; Waimea, 23; Kona, 64; Kau, 375; Puna, 100; Maui, varying all the way from 10 to 100; Oahu, 80 to 175; South Kauai, 300; North Kauai, 120. The drought in North Hawaii, viz, in Hamakua and Kohala, was broken by rains setting in on the 21st. Later indications are of varying winds and abundant rain. Hilo, Kau, had 7.50 inches in twenty-four hours, ending 31st; other Kau stations nearly as much.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 80.1°; average minimum, 69.9°; Waimea, Hawaii, 2,730 elevation, 77.6° and 65.4°; Kohala, 521 feet elevation, 81.5° and 70.7°; Walakoa, Kula, Maui, 2,700 elevation, 81.3° and 60.6°; Kulaokahua, W. R. Castle's 60 feet elevation, highest, 88°; lowest, 67.5°; mean, 75.7°; Ewa Mill, 50 feet elevation, average maximum 85.6°; average minimum, 68.6°; probable mean, 76.4°.

The principal event of the month was the setting in of rains on the 21st on Hawaii Island. The storm of the 3d was singularly confined to Kauai and Oahu. A heavy swell set in on windward coasts at the end of the month. Slight snow fell on Mauna Kea on the 29th. Light earthquake was felt at Kohala, 3 a. m. 15th. Thunder and lightning accompanied by heavy rains on Maui on the 30th.

NOTE.—In view of the remark made in the above report as to continuous low barometer and probable sequel, it may be interesting to know that torrential rains were falling on the island of Hawaii before that report appeared in print. Twenty-five inches in forty-eight hours are officially reported from Hilo¹, and verbal report gives 30 inches in two days at Olaa.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. Maxwell Hall, the following data are offered to the MONTHLY WEATHER REVIEW in advance of the publication of the regular monthly weather report for Jamaica:

Jamaica, W. I., climatological data, October, 1901.

	Negril Point Lighthouse.	Morant Point Lighthouse.
Latitude (north)	18° 15'	17° 55'
Longitude (west)	78° 28'	78° 10'
Elevation (feet)	38	8
Mean barometer { 7 a. m.	29.857	29.844
{ 3 p. m.	29.975	29.788
Mean temperature { 7 a. m.	79.9	.....
{ 3 p. m.	84.8	.....
Mean of maxima	87.0	.....
Mean of minima	74.2	.....
Highest maximum	89.0	.....
Lowest minimum	71.0	.....
Mean dew-point { 7 a. m.	74.8	.....
{ 3 p. m.	78.8	.....
Mean relative humidity { 7 a. m.	89.0	.....
{ 3 p. m.	71.0	.....
Total rainfall (inches)	8.44	9.15
Average wind direction { 7 a. m.	nne.	n.
{ 3 p. m.	nne.	nne.
Average hourly velocity, miles { 7 a. m.	6.2	5.9
{ 3 p. m.	10.6	9.9
Average cloudiness (tenths):		
7 a. m. { Lower clouds	0.3	1.4
{ Middle clouds	2.4	1.4
{ Upper clouds	2.7	1.0
3 p. m. { Lower clouds	0.6	1.8
{ Middle clouds	5.5	2.1
{ Upper clouds	0.7	1.1

NOTE.—The pressures are reduced to standard temperature and gravity, to the New standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

¹ November 8-9.

Comparative table of rainfall for October.
(Based upon the average stations only.)

Divisions.	Relative area.	Number of stations.	Rainfall.	
			Average.	1901.
			Inches.	Inches.
Northeastern division.....	25	21	15.12	12.99
Northern and subcentral division....	22	52	7.81	7.92
Western-central division.....	26	22	13.42	9.09
Southern division.....	27	32	12.37	9.02
General means.....	100	127	12.18	9.76

In taking the average rainfall Mr. Hall uses only those stations for which he has several years of observation, so that the column of averages represents fairly well the normal rainfall for each division, while the column for the current month represents the average rainfall at those same stations. The relative areas of the divisions are very nearly the same and are given in the preceding table as expressed in percentages of the total area of Jamaica. The number of rainfall stations utilized in each area varies slightly from month to month, according as returns have come in promptly or not, but will not differ greatly from the numbers in the second column of the table.

Jamaica, W. I., climatological data, November, 1901.

	Neap Point Lighthouse.	Morant Point Lighthouse.
Latitude (north).....	18° 15'	17° 55'
Longitude (west).....	78° 23'	76° 10'
Elevation (feet).....	88	8
Mean barometer { 7 a. m.	29.918	29.906
{ 3 p. m.	29.864	29.860
Mean temperature { 7 a. m.	76.3	.....
{ 3 p. m.	83.1	.....
Mean of maxima.....	85.9	.....
Mean of minima.....	78.6	.....
Highest maximum.....	89.0	.....
Lowest minimum.....	64.0	.....
Mean dew-point { 7 a. m.	70.0	.....
{ 3 p. m.	71.1	.....
Mean relative humidity { 7 a. m.	81.0	.....
{ 3 p. m.	67.0	.....
Total rainfall (inches).....	0.79	11.40
Average wind direction { 7 a. m.	nne.	n. nne.
{ 3 p. m.	n. nne.	n. nne.
Average hourly velocity, miles { 7 a. m.	10.7	14.2
{ 3 p. m.	15.7	15.1
Average cloudiness (tenths):		
7 a. m. { Lower clouds.....	0.6	1.5
{ Middle clouds.....	2.3	2.2
{ Upper clouds.....	3.5	1.2
3 p. m. { Lower clouds.....	0.0	2.8
{ Middle clouds.....	5.6	1.9
{ Upper clouds.....	1.5	0.9

NOTE.—The pressures are reduced to standard temperatures and gravity, to the Kew standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

Comparative table of rainfall for November.
(Based upon the average stations only.)

Divisions.	Relative area.	Number of stations.	Rainfall.	
			Average.	1901.
			Inches.	Inches.
Northeastern division.....	25	21	10.91	23.14
Northern and subcentral division....	22	52	5.73	8.97
Western-central division.....	26	20	6.06	4.36
Southern division.....	27	31	4.73	3.62
General means.....	100	124	6.86	10.02

CUMULUS CLOUDS FORMED BY SMOKE.

By W. H. MITCHELL, Bayonne, N. J.

During the field maneuvers and meteorological kite as-

cension of the Bayonne kite corps at their field station, November 28, 1901, a large column of smoke was observed to the northward.

It was 11:30 a. m. when the smoke was first noticed, and while the members were speculating as to the location of the fire the crest of the smoke column suddenly became capped with the white vapor of the cumulus cloud formation.

Afterward the smoke evidently rose higher than the white vapor between the observers and the new formed cloud so that for a few moments it was invisible, only to reappear later.

Finally the smoke dissipated, leaving the new formed cloud alone in the northern sky, and increasing in size. It was visible for nearly two hours before it finally disappeared from view.

The fire was slightly west of north from Bayonne and several miles distant. The minimum temperature of the day at Bergen Point was 18°, the maximum 27°. Sky absolutely clear at the time.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

TABLE 1.—Hourly observations at the Observatory, San Jose de Costa Rica, during November, 1901.

Hours.	Pressure.		Temperature.		Relative humidity.		Rainfall.		
	Observed, 1901.	Normal, 1880-1900.	Observed, 1901.	Normal, 1880-1900.	Observed, 1901.	Normal, 1880-1900.	Observed, 1901.	Normal, 1880-1900.	Duration, 1901.
	660+ Mm.	660+ Mm.	° C.	° C.	%	%	Mm.	Mm.	Hrs.
1 a. m.	4.38	3.10	16.64	17.05	89	92	8.8	2.0	3.66
2 a. m.	4.01	2.78	16.47	16.81	88	92	6.0	2.0	5.00
3 a. m.	3.77	2.60	16.24	16.65	88	92	8.5	1.1	4.08
4 a. m.	3.77	2.54	16.20	16.53	89	92	11.5	0.7	3.92
5 a. m.	3.98	2.80	16.15	16.44	88	92	6.9	1.1	3.00
6 a. m.	4.38	3.23	16.10	16.38	89	91	4.4	2.7	3.00
7 a. m.	4.70	3.57	17.45	17.68	82	86	3.2	0.3	3.00
8 a. m.	5.00	3.98	18.90	19.52	76	80	3.6	1.2	3.00
9 a. m.	5.16	4.18	20.37	21.49	73	75	1.0	1.8	1.42
10 a. m.	5.14	4.08	21.68	22.03	71	70	1.9	1.3	1.17
11 a. m.	4.79	3.75	22.38	22.75	70	70	2.4	2.1	1.88
12 m.	4.19	3.15	22.98	24.05	70	70	1.1	2.6	1.38
1 p. m.	3.65	2.57	22.61	23.94	70	71	2.1	7.2	1.67
2 p. m.	3.19	2.05	22.19	22.81	73	74	7.5	14.7	5.00
3 p. m.	3.02	1.85	21.39	22.36	76	77	3.9	20.0	5.41
4 p. m.	3.13	1.97	20.27	21.22	80	81	18.6	18.7	5.99
5 p. m.	3.41	2.24	19.08	20.15	80	85	22.9	19.3	4.16
6 p. m.	3.74	2.66	18.37	19.80	85	87	15.1	21.0	5.08
7 p. m.	4.26	3.19	18.06	18.65	86	89	12.4	10.8	5.06
8 p. m.	4.67	3.62	17.86	18.38	86	89	12.1	8.5	4.27
9 p. m.	5.00	3.92	17.72	18.05	86	90	2.0	5.4	2.50
10 p. m.	5.08	3.99	17.51	17.72	87	91	6.1	4.9	1.67
11 p. m.	5.04	3.86	17.32	17.42	87	91	11.6	2.5	1.94
Midnight.....	4.80	3.55	16.95	17.19	88	92	9.1	2.4	2.19
Mean.....	664.26	663.08	18.78	19.44	82	84	.....	.....	.....
Minimum.....	661.1	659.38	14.0	11.2	53	.....	.....	.....	.....
Maximum.....	666.9	667.22	29.3	29.0	100	.....	16.4	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	182.7	154.2	78.65

REMARKS.—The barometer is 1,169 meters above sea level. Readings are corrected for gravity, temperature, and instrumental error. The dry and wet bulb thermometers are 1.5 meters above ground and corrected for instrumental errors. The hourly readings for pressure, wet and dry bulb thermometers, are obtained by means of Richard registering instruments, checked by direct observations every three hours from 7 a. m. to 10 p. m. The hourly rainfall is as given by Hottinger's self-register, checked once a day. Under maximum, the greatest hourly rainfall for the month is given. The standard rain gage is 1.5 meters above ground. In the Costa Rican system the San Jose local time is used, which is 0° 36' 18.3" slower than seventy-fifth meridian time.

Notes on the weather.—At San Jose the average pressure was above, and the average temperature below the normal, but the maximum temperature was the highest ever recorded for November. The relative humidity was slightly below the normal and the hours of sunshine were only about two-thirds of the normal number. Altogether November was quite abnormal as compared with the usual weather in San Jose at this